BRITISH COLUMBIA
MINISTRY OF FORESTS

Tree Farm Licence 52

Issued to West Fraser Mills Ltd.

Rationale for Allowable Annual Cut (AAC) Determination

Effective January 1, 2003

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Deputy Chief Forester

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Objective of this Document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence (TFL) 52. This document also identifies where I believe new or better information is needed for incorporation in future determinations.

Description of the TFL

TFL 52 is located east of Quesnel and is bounded by Bowron Lake Provincial Park and the Quesnel Timber Supply Area (TSA) to the west, the Williams Lake TSA to the south, and the Prince George TSA to the north. The TFL is held by West Fraser Mills Ltd. (the "licensee") and is administered from the British Columbia Forest Service (BCFS) Quesnel Forest District Office in Quesnel, within the Cariboo Forest Region.

The geography of the TFL is characterized by rolling plateaux in the west and the Cariboo Mountains in the east. The TFL contains the headwaters of the Cottonwood, Bowron, and Willow Rivers, which all flow into the Fraser River. The dominant commercial tree species on TFL 52 are spruce (51 percent), lodgepole pine (28 percent), sub-alpine fir (18 percent), and Douglas-fir (1 percent).

Three biogeoclimatic zones occur within the TFL. The Sub-Boreal Spruce (SBS) zone and the Engelmann Spruce-Subalpine-Fir (ESSF) zone are located essentially below and above 1200 metres elevation, respectively. The Interior Cedar-Hemlock (ICH) zone covers a very small area near the eastern boundary of the TFL.

The total area of TFL 52 is 258 866 hectares, with productive forest covering 235 023 hectares, or 91 percent of the TFL. In the base case, 186 494 hectares (79 percent) of the total productive land base were assumed to constitute the long-term timber harvesting land base.

History of the AAC

TFL 52, also known as the Bowron-Cottonwood TFL, was originally issued to the licensee in January 1991 in exchange for its forest licence holdings in the Prince George Forest Region and a portion of its forest licence in the Quesnel TSA. The licensee still retains some AAC under a forest licence in the Quesnel TSA. The AAC for TFL 52 was initially set at 518 952 cubic metres in 1991 and was increased by 6 percent to the current level of 549 000 cubic metres effective December 1, 1996.

New AAC determination

Effective January 1, 2003, the new AAC for TFL 52 will be 570 000 cubic metres, 3.8 percent higher than the current AAC of 549 000 cubic metres.

This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination unless the re-determination date is formally postponed according to the provisions of Section 8 of the Forest Act.

Information sources used in the AAC determination

Information considered in determining the AAC for TFL 52 include the following:

- *Statement of Management Objectives, Options and Procedures (SMOOP) for Management Plan (MP) No. 3,* Tree Farm Licence 52, accepted April 10, 2000;
- *West Fraser Mills Ltd., Bowron-Cottonwood Tree Farm License (TFL 52) Management Plan 3, Timber Supply Analysis Information Package*, accepted December 8, 2000;
- Existing stand yield tables for TFL 52, accepted by the BCFS Resources Inventory Branch (now the Ministry of Sustainable Resource Management, Terrestrial Information Branch), October 23, 2000;
- Managed stand yield tables and site index curves, accepted by BCFS Research Branch, November 20, 2000;
- *Overview of Inventory Audit Results: TFL 52 (new stratification)*, BCFS Resources Inventory Branch (now the Ministry of Sustainable Resource Management, Terrestrial Information Branch), revised July 27, 2000;
- *West Fraser Mills Ltd., Bowron-Cottonwood Tree Farm License (TFL 52) Management Plan 3, Timber Supply Analysis*, accepted August 1, 2001;
- *West Fraser Mills Ltd., Quesnel Division, Bowron-Cottonwood Tree Farm License (TFL 52) Management Plan 3,* approved March 1, 2002;
- *TFL 52, Twenty-Year Harvest Plan for Management Plan 3*, West Fraser Mills Ltd., accepted February 21, 2002;
- Memorandum from the Director of Timber Supply Branch of the Ministry of Forests, dated December 1, 1997, entitled *Incorporating Biodiversity and Landscape Units in the Timber Supply Review*;
- *Identified Wildlife Management Strategy*, February 1999;
- Landscape Unit Planning Guide, BCFS and MELP, March 1999;
- Higher Level Plans: Policy and Procedures, BCFS and MELP, December 1996;
- *Forest Practices Code of British Columbia Act* (Forest Practices Code), consolidated to March 2001;
- *Forest Practices Code of British Columbia Act Regulations and Amendments*, current as of April 2001;

- *Forest Practices Code of British Columbia Guidebooks*, BCFS and MELP;
- *Cariboo-Chilcotin Land Use Plan (CCLUP)*, October 1994;
- *Cariboo-Chilcotin Land Use Plan: Ninety-day Implementation Process, Final Report*, February 1995;
- *Cariboo-Chilcotin Land Use Plan Integration Report*, April 1998;
- *Biodiversity Conservation Strategy for the Cariboo-Chilcotin Land Use Plan*, July 1996;
- *Cariboo Region Landscape Unit Planning Strategy*, 1999;
- *Cariboo-Chilcotin Land Use Plan Caribou Strategy Committee Update*, September 1998;
- *Cariboo-Chilcotin Land Use Plan Mountain Caribou Strategy*, October 2000;
- Letter from the Deputy Ministers of Forests and Environment, Lands and Parks (MELP), dated August 25, 1997, conveying government's objectives regarding the achievement of acceptable impacts on timber supply from biodiversity management;
- Letter from the District Managers of the Williams Lake, Horsefly, 100 Mile, Chilcotin and Quesnel Forest Districts, and the Designated Environment Official, dated October 30, 2000, regarding the expectations and information requests of the Statutory Decision Makers (SDMs) in the Cariboo Forest Region;
- Letter from the Minister of Forests to the Chief Forester, dated July 28, 1994, stating the Crown's economic and social objectives;
- Memorandum from the Minister of Forests to the Chief Forester, dated February 26, 1996, stating the Crown's economic and social objectives with regard to visual resources;
- Technical review and evaluation of current operating conditions on TFL 52 through comprehensive discussions with BCFS and Ministry of Water, Land, and Air Protection (formerly the Ministry of Environment, Lands, and Parks) staff, notably at the AAC determination meeting held in Victoria on June 28, 2001.

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variations in physical, biological and social

conditions, although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide complete answers or solutions to forest management problems such as AAC determinations. The information does, however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for TFL 52, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for timber supply areas (TSAs) and TFLs. Section 8 is reproduced in full as Appendix 1.

In accordance with Section 23(3) of the *Interpretation Act*, the deputy chief forester is expressly authorized to carry out the functions of the chief forester which include those required under Section 8 of the *Forest Act*.

The chief forester has expressed the importance of consistency of judgement in making AAC determinations. I also recognize the need for consistency of approach. I am familiar with the guiding principles that the chief forester has employed in making AAC determinations. I find these principles to be reasonable and appropriate, and I have adopted them as described below in making my AAC determination for TFL 52.

Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. When a large number of determinations for many forest management units are made over extended periods of time, administrative fairness requires a reasonable degree of consistency of approach in incorporating these changes and uncertainty. The principles that guide my determinations are set out below. If in some specific circumstance I believe it is appropriate to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

(i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and

(ii) re-determining AACs frequently, to ensure they incorporate current information and knowledge, a principle that has been recognized in the legislated requirement to re-determine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation of current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest Practices Code of British Columbia Act* and its associated regulations (the Forest Practices Code).

The *Forest Practices Code of British Columbia Regulations* were approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995.

Although the Forest Practices Code has been fully implemented since the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination the chief forester takes this uncertainty into account to the extent possible in the context of the best available information. In making my determination for TFL 52, as deputy chief forester, I have followed the same approach.

More recently, on November 21, 2002, government passed the new *Forest and Range Practices Act*, which is expected to take effect on April 1, 2003, ultimately replacing the *Forest Practices Code of British Columbia Act*. As the timber supply implications of this new Act and any pursuant regulations become clear and measurable, they will be accounted for in AAC determinations. Uncertainties will continue to be handled as they have been under the current legislative regime.

As British Columbia progresses toward completion of strategic land-use plans, the timber supply impacts associated with the land-use decisions resulting from the various planning processes are important to AAC determinations. Where specific protected areas have been designated by legislation or by order in council, these areas are no longer considered to be part of the timber harvesting land base or to contribute to the timber supply in AAC determinations.

Because the outcomes of planning processes are subject to significant uncertainty until formal approval by government, it has been and continues to be the position of the chief forester that in determining AACs it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions that have not yet been taken by government. I consider this approach to be reasonable and appropriate. Like the chief forester, I will therefore not take into account the possible impacts of

existing or anticipated recommendations made by such planning processes, nor attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impact in a current AAC determination. In many cases, government's land-use decisions must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

TFL 52 lies within the area covered by the Cariboo-Chilcotin Land-Use Plan (CCLUP). Therefore forest management activities in the TFL are required to be consistent with aspects of the plan that incorporate Higher Level Plan (HLP) direction as provided under the Forest Practices Code. The Cariboo Mid-Coast Interagency Management Committee (CMC-IAMC) and the Cariboo-Chilcotin Regional Resource Board (CC-RRB) are mandated by government to monitor the implementation of the CCLUP. The CMC-IAMC and CC-RRB provide advice to the Forest Practices Code statutory decision-makers regarding the best information available with respect to consistency with the CCLUP. The statutory decision-makers periodically inform licensees on how they will consider this advice or information in operational plan decisions. The timber supply analysis and my considerations in this AAC determination are consistent with the direction from the statutory decision-makers to licensees as representative of current management.

A number of intensive silviculture activities have the potential to affect timber supply, particularly in the long term. As with all components of an AAC determination, like the chief forester, I require sound evidence before accounting for the possible effects of intensive silviculture on timber supply. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to re-determine many outdated AACs between 1992 and 1996. In any case, the data and models available today are improved from those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, the chief forester should immediately reduce some AACs in the interest of caution. However, any AAC determination made by the chief forester or myself must be the result of applying our individual judgement to the available information, taking any uncertainties into account.

Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I have made allowances for risks that arise because of uncertainty.

Overall, in making this AAC determination, as deputy chief forester, I am mindful of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act* and of the chief forester's responsibilities under the *Forest Practices Code of British Columbia Act* and the *Forest Act*.

Guiding principles with respect to First Nations

With respect to First Nations' issues, I am aware of the Crown's legal obligations, particularly as clarified in judgements by the Supreme Court of Canada and the British Columbia Court of Appeal. The AAC that I have determined should not in any way be construed as limiting those obligations under these decisions, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within TFL 52.

The British Columbia Court of Appeal decided in March 2002 the Crown has an obligation to consult with First Nations with respect to asserted rights and title in a manner proportional to the apparent strength of the interests. As a matter of course, I consider any information brought forward by all parties respecting First Nations' interests. In particular I consider information related to actions taken to protect interests, including operational plans that describe forest practices designed to address First Nations' interests. In this context, I re-iterate that my AAC determination does not prescribe a particular plan of harvesting activity, nor does it involve allocation of the wood supply to any particular party.

Subsequent to a determination, if I become aware of information respecting First Nations interests that would substantially alter my understanding of relevant circumstances, I may revisit my determination sooner than as required by the *Forest Act*.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me as part of the Timber Supply Review program.

For each AAC determination for a TFL a timber supply analysis is carried out using an information package including data and information from three categories—land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model, a series of timber supply forecasts is produced, reflecting different starting harvest levels, rates of change over time, and potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen which attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the 'base case' forecast, and

forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TFL is not a portrayal of AACs over time. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it. In some cases, an AAC is determined that coincides with the base case starting point. In other cases, an AAC is determined which differs significantly from the modelled starting point.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which the assumptions made in generating the base case forecast are realistic and current, and the degree to which I believe its predictions of timber supply should be adjusted to more properly reflect the current situation.

These adjustments are made on the basis of informed judgement, using current available information about forest management, which may have changed since the original information package was assembled. Forest management data are particularly subject to change during periods of legislative or regulatory change, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but rather is a synthesis of analysis and judgement in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the initial harvest level in a base case forecast. Judgements that may be based in part on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

Timber supply analysis

The timber supply analysis for TFL 52 was prepared by Timberline Forest Inventory Consultants (Timberline) under the direction of licensee staff. Timberline used its proprietary timber supply model Critical Analysis of Schedules for Harvesting, version 6 (CASH 6). This model can be used to project spatially-implicit or spatially-explicit timber supply forecasts. Spatially explicit in this context means that the model accounts for the spatial relationship between mapped cutblocks, while spatially implicit means that the model does not track cutblocks (i.e., it does not track the spatial relationship between cutblocks), but rather it approximates the timber supply impacts of implementing spatial restrictions using forest cover constraints.

For this analysis, the licensee used CASH 6 in a spatially-implicit mode for the timber supply analysis and the spatially-explicit mode to develop the associated twenty-year

plan. Based on a review by BCFS staff, as well as my previous experience reviewing the results of this model, I am satisfied that the spatially-implicit version of CASH 6 is capable of providing a reasonable projection of timber supply.

In the base case, an initial harvest level of 596 900 cubic metres per year, which is about 9 percent higher than the current AAC, is maintained for 5 decades. Beginning at decade 6 the harvest forecast increases by about 9 percent to 650 100 cubic metres per year and beginning at decade 8 the harvest forecast increases by another 9 percent to 709 900 cubic metres per year. The harvest forecast increases another 3.6 percent to a long-term harvest level of 735 700 cubic metres per year starting in decade 11. The harvest levels presented in the base case are net of unsalvaged losses.

In the timber supply analysis, various sensitivity analyses were conducted to assess the potential implications for timber supply arising from uncertainty in data assumptions and estimates. All the sensitivity analyses prepared for this determination were based on the assumptions used in the base case. These sensitivity analyses have also assisted me in considering the factors leading to my determination.

As discussed throughout this rationale, and in consideration of the items described above, I am satisfied that the information presented to me provides an adequate basis from which I can assess the timber supply for TFL 52 for this determination.

Consideration of Factors as Required by Section 8 of the *Forest Act*

Section 8 (8)

In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

Land base contributing to timber harvesting

- general comments

In deriving an assumed timber harvesting land base for the purposes of a timber supply analysis, the licensee deducted certain areas from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest, for ecological, economic or social (e.g., parks) reasons.

For TFL 52 these deductions result in a long-term timber harvesting land base of 186 494 hectares, or approximately 79 percent of the productive forest land. I have considered all of the deductions applied in the derivation of the timber harvesting land base. In this document I will not discuss deductions with which I completely agree, namely those for non-forested and non-productive areas; non-commercial cover (brush); future roads, trails, and landings; and economic and physical operability. The other deductions are discussed below.

- protected areas

In 1993 Government released *A Protected Areas Strategy for British Columbia*, which describes the policies and process to protect 12 percent of the province. The strategy has two goals: representativeness (Goal 1) which protects viable examples of the natural diversity of the province, and special features (Goal 2) which protect the special natural, cultural heritage, and recreational features of the province.

As part of the protected area strategy, two Candidate Goal 2 protected areas were proposed within TFL 52. When the timber supply analysis for this determination was conducted, these protected areas, totalling 932 hectares of productive forest, had not been established as parks.

In the base case, the two proposed protected areas were included in the timber harvesting land base. A sensitivity analysis prepared by the licensee indicates that excluding the Candidate Goal 2 protected areas from the timber harvesting land base had no effect on timber supply throughout the forecast period.

BCFS district staff indicate that since the completion of the timber supply analysis, one of the proposed Goal 2 areas, Deacon Creek, has been rescinded. Operationally the remaining Candidate Goal 2 protected area on Two Sisters Mountain is being deferred from harvest, and no harvesting activity within this area is anticipated to take place in the near future.

From discussions with BCFS staff regarding protected areas, I am satisfied that management of the Candidate Goal 2 area is consistent with its intended status, and that resource values in this area are not at risk.

For this determination, I conclude that the Candidate Goal 2 areas were appropriately included in the timber harvesting land base assumed in the base case, as these areas have not been established as parks by government. As discussed under "Guiding principles for AAC determinations", it would therefore be inappropriate for me to speculate on the timber supply impacts that may eventually result from land-use decisions that have not yet been taken by government. In any event, sensitivity analysis indicates that the timber supply for TFL 52 is not sensitive to the exclusion of the Goal 2 protected areas from the timber harvesting land base.

- roads, trails, and landings

In the timber supply analysis, a percentage of the productive forest was excluded from the timber harvesting land base to account for the losses resulting from the construction of roads, trails, and landings. Separate estimates were made for both existing and future roads, trails, and landings, to reflect current access as well as anticipated road network requirements. I am satisfied with the accounting for future roads, trails and landings in the base case and I will not discuss this factor in detail in this rationale.

For existing roads on TFL 52, the licensee identified a total of 4078 kilometres from its Geographic Information System (GIS) database. To determine the associated area of existing roads, the licensee physically measured road widths for each of four road categories assumed in the analysis. Based on these measurements, road-width buffers of

20 metres, 15 metres, 10 metres, and 6 metres were then applied in the GIS to primary, secondary, spur, and in-block roads, respectively. A total of 4163 hectares were excluded from the timber harvesting land base. The licensee also excluded a further 1029 hectares from the timber harvesting land base to account for polygons identified as roads in the new Vegetation Resources Inventory (VRI).

In its timber supply analysis, the licensee assumed that all skid trails and landings are fully rehabilitated and planted after harvesting. Although areas associated with in-block roads and trails were excluded from the timber harvesting land base, no such deductions were applied to account for landings. Subsequently, the licensee reviewed existing landings on the TFL and estimated that landings—net of roads—accounted for 614 hectares of previously productive forest land. Based upon an aerial survey, the licensee estimated that about 80 percent of the area of these landings (491 hectares) was not restocked. BCFS district staff have reviewed the licensee's estimates of road lengths and widths and indicate that they appropriately reflect current conditions on the TFL.

Having reviewed and discussed the information regarding existing roads, trails, and landings with BCFS staff, I accept the assumptions used in the timber supply analysis for roads and trails. However, I note that up to 80 percent of the area of old landings on the TFL was assumed to contribute to timber supply, yet has not been restocked. Therefore, I conclude that the timber harvesting land base assumed in the base case may be over-estimated by approximately 500 hectares, resulting in a very small (0.3 percent) potential over-estimation in mid- to long-term timber supply. I will discuss this further under *'Reasons for Decision'*.

- sites with low timber growing potential

In its timber supply analysis, the licensee excluded several classes of stands to account for low productivity and non-merchantable stands that are typically not harvested.

The licensee excluded stands with site indices (see *site productivity*) of less than 7 metres from contributing to the timber harvesting land base. The licensee based this minimum site index criterion on its assumption that stands must achieve a minimum volume of at least 120 cubic metres per hectare by age 150 years to be merchantable. All previously harvested and fully restocked stands, except intermediate utilization balsam stands (described in the following section), were assumed to be capable of producing merchantable volumes of timber again in the future. Therefore, these stands were not excluded. In total, the licensee excluded 2695 hectares of low productivity stands from the timber harvesting land base.

BCFS staff agree that the licensee's criterion for low productivity stands is representative of current practice. However, in their review of the base case they noted that about 1600 hectares of old-growth stands (about 1 percent of the timber harvesting land base) that were excluded from the timber harvesting land base on the basis that their site index was less than 7 metres had volumes in excess of 120 cubic metres per hectare. The licensee conducted a sensitivity analysis that showed that including these stands increases timber supply by approximately one percent over the forecast period.

I have reviewed and discussed the information regarding sites with low timber growing

potential with BCFS staff. For this determination, I agree that the timber harvesting land base is likely under-estimated by approximately 1600 hectares on account of this factor and that the base case timber supply may be under-estimated by up to one percent over the forecast period. I will discuss this further under '*Reasons for Decision*'.

- intermediate utilization balsam stands

TFL 52 contains a significant area of residual subalpine fir (hereafter referred to as "balsam") stands resulting from historic intermediate utilization (IU) harvesting. During the 1960s, timber harvesting activities were based on IU standards, whereby smaller, undesirable species less than a specific diameter were left uncut, leaving "residual" stands composed primarily of suppressed balsam stems. These stands—classified as "IU balsam"—are typically characterized by low stocking and stand volume.

In the 1996 AAC rationale for TFL 52, the chief forester asked the licensee to submit a treatment plan for these stands as part of its 5-year silviculture plan. In response, the licensee initiated a study and found that of the 11 000 hectares of IU balsam stands on TFL 52:

- 47 percent were well-stocked, exhibited good growth potential, and required no further treatment;
- 22 percent had reached minimum stocking standards and probably required no further treatment;
- 20 percent appeared to be poorly stocked and might require treatment; however, this was subject to further field verification;
- 8 percent had sufficient merchantable volume to be considered for harvesting; and
- 3 percent consisted primarily of birch, aspen, and cottonwood stands.

In the base case the licensee excluded non-merchantable stands, including some balsam IU stands, from the timber harvesting land base. Non-merchantable stands were defined as those stands that would not achieve a minimum coniferous volume of 120 cubic metres per hectare at age 150 years and stands currently older than 150 years with less than 120 cubic metres per hectare of coniferous volume. After accounting for previous deductions from the timber harvesting land base, the licensee excluded 3954 hectares of stands classified as IU balsam.

BCFS district staff acknowledge the uncertainty associated with the merchantability of IU balsam stands. However, they note that there has been virtually no harvesting performance to date in these stands, many of which contain as little as 75 cubic metres of merchantable timber per hectare.

To test the potential contribution of these stands, the licensee provided a sensitivity analysis whereby all IU balsam stands were assumed to contribute to the timber harvesting land base. The results indicate that an initial harvest level two percent higher than projected in the base case could be achieved. A long-term harvest level of 737 100 cubic metres per year, which is less than one percent higher than projected in the base case, could be maintained if all IU balsam stands actually contributed to timber

production.

I acknowledge that in its Management Plan (MP) No. 3 the licensee has committed to further assess the area occupied by IU balsam stands and to implement an appropriate survey, prescription, and treatment program. In the absence of better information, I accept the exclusion of 3954 hectares of IU balsam stands from the timber harvesting land base as appropriate for this determination.

However, I note that approximately two-thirds of the stands classified as IU balsam were included in the timber harvesting land base and that there is still considerable uncertainty regarding the extent to which these stands will actually contribute to timber supply. I therefore request that the licensee further review the potential for harvesting of all IU balsam stands on TFL 52 prior to the next determination. I will discuss this further below under *'Reasons for Decision'*.

- deciduous-leading stands

The licensee identified a total of 4146 hectares of deciduous-leading stands from the forest inventory files for TFL 52. This represents approximately one percent of the gross area of the TFL.

According to the licensee, it excluded from the timber harvesting land base all deciduous-leading stands that were not expected to yield at least 120 cubic metres per hectare of coniferous volume by the age of 150 years. After accounting for previous deductions, 3359 hectares of deciduous-leading stands were excluded in deriving the timber harvesting land base. Volumes attributable to the minor deciduous component in conifer-leading stands were included in the yield tables for these stands.

The licensee indicates that between 1995 and 1999 (inclusive) it has been harvesting between 4400 and 10 000 cubic metres per year of deciduous volume. BCFS district staff confirm that the licensee is currently harvesting deciduous trees in conifer-leading stands. However, they indicate that harvesting of deciduous-leading stands has decreased in recent years due to the redirection of harvesting efforts to mountain pine beetle salvage operations. District staff also note that the licensee has committed to retaining a proportion of aspen stands for wildlife habitat and biodiversity values.

For this determination I have considered the information and associated uncertainty respecting the potential contribution of deciduous species to timber supply. I find it likely that the timber supply projected in the base case may be under-estimated and I will discuss this under *'Reasons for Decision'*. Although, I note that deciduous-leading stands represent a relatively small proportion (about one percent) of the gross area of the TFL, I request that the licensee and district staff further monitor harvesting of deciduous-leading stands and report performance in time for the next determination.

Existing forest inventory

- general comments

During the term of MP No. 2, the licensee completed phase 1 (based upon aerial photograph interpretation) of a vegetation resources inventory (VRI) for TFL 52. For the

analysis, the licensee updated the inventory information to December 1999 to account for growth and depletion.

I have considered the licensee's forest inventory information, and am satisfied that the best available information was used in the analysis.

- volume estimates for existing stands

The licensee used the BCFS Variable Density Yield Prediction (VDYP) growth and yield model to generate volume estimates for all existing unmanaged (natural) stands. Unmanaged stands were assumed to be those stands aged 20 years and older. The volume estimates also included the deciduous component of conifer-leading stands.

VDYP is based on information gathered from a large number of sample plots throughout the province, and is generally accepted in British Columbia as an adequate model for projecting volumes in existing natural stands. As a general rule in making AAC determinations, and in the absence of statistically valid contradictory evidence for a particular area, I rely on VDYP estimates for existing natural stands.

An inventory audit of the previous inventory was completed during the term of MP No. 2. The audit data were subsequently restratified and analyzed; the results indicated that the volumes derived from the audit were 10 percent higher than those based on the VRI. Volume estimates for existing unmanaged stands were reviewed and approved for use in the analysis by BCFS Resources Inventory Branch staff.

I have reviewed the information and assumptions used in the analysis regarding existing stand volumes. I note that the inventory audit suggests that the existing stand volumes for TFL 52 may be under-estimated by up to 10 percent. Therefore I encourage the licensee to complete phase 2 of the VRI in order to clarify this issue in time for the next determination. For this determination I accept the assumptions used regarding existing stand volumes as the best available information.

Expected rate of growth

- site productivity estimates

Inventory data include estimates of site productivity for each forest stand, expressed in terms of a site index which is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow. This in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the age at which a stand will satisfy mature forest cover requirements and reach a merchantable size.

In general, in British Columbia, it has been found that site indices determined from younger stands (i.e., less than 31 years old), and older stands (i.e., over 150 years old) may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, which have not been subject to management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not

reflect the true growing potential of the site. This has been verified in several areas of the province where studies—such as the Old-Growth Site Index (OGSI) 'paired plot' project and the 'veteran' study—as well results from using the Site Index Biogeoclimatic Ecosystem Classification System (SIBEC) suggest that actual site indices may be higher than those indicated by existing data from old-growth forests. In recent years it has been concluded from such studies that site productivity has generally been under-estimated by older inventories; managed stands tend to grow faster than projected by inventory-based site index estimates from old-growth stands.

In the TFL 52 base case, the licensee incorporated new estimates of site indices developed by J.S. Thrower and Associates Ltd. Preliminary site index estimates developed for lodgepole pine, interior spruce, Douglas-fir, and balsam were used to derive average potential site index (PSI) estimates for all species. These estimates were assigned to each TEM polygon, and then adjusted to reflect the field sampling of a total of 67 pine-leading stands between 15 and 80 years of age, and spruce-leading stands between 18 and 80 years of age. Due to sampling limitations, adjustments to the estimated site indices for Douglas-fir and balsam were based upon standard BCFS species conversion formulas applied to the adjusted estimates for pine and spruce on the TFL area.

BCFS Research Branch staff reviewed and accepted the assignment of site indices for all stands in the base case. Having reviewed and discussed the information regarding site productivity estimates with BCFS staff, I am satisfied that the site indices used in the base case are based upon the best available information and are therefore suitable for use in this determination.

- *volume estimates for managed stands*

The Table Interpolation Program for Stand Yields (TIPSY) model, developed by the BCFS Research Branch was used to estimate volumes for managed stands. Managed stands for TFL 52 were defined as all stands 20 years of age or less and all stands regenerated in the future. All managed stand yield tables were reviewed and accepted by Research Branch staff for use in the analysis.

The licensee provided a sensitivity analysis to show the impact on timber supply of decreasing the managed stand yields by 10 percent. The results showed there was no impact on the modelled initial harvest level; however, the long-term harvest level decreased by approximately 9 percent.

At the request of BCFS staff, the licensee also provided a sensitivity analysis to assess the impact on timber supply of any cumulative impact due to uncertainties associated with site index, use of select seed (see *'select seed'*, below), and the model used to generate the managed stand yield tables. In this analysis, decreasing the managed stand yields by 40 percent resulted in a three percent reduction in the short-term harvest level. In decade five the harvest level was reduced by 13 percent and in the long term by 40 percent to 445 100 cubic metres per year.

I have reviewed and discussed the volume estimates for managed stands with BCFS staff.

For this determination, I am satisfied that the volume estimates for managed stands were based upon the best available information and are, therefore, suitable for use in this determination. Based upon my review, I note that even if managed stand yields have been over-estimated by 10 percent, the long-term timber supply for this management unit is still projected to be higher than the initial harvest level projected in the base case.

- operational adjustment factors

Certain operational conditions, such as less than ideal tree distribution, small non-productive areas, endemic pests and diseases, or age dependent factors such as decay, waste and breakage may cause yields to be reduced over time. Operational adjustment factors (OAFs) are applied to yields generated using TIPSY to account for losses of timber volume resulting from these operational conditions. OAF 1 can account for factors affecting the yield curve across all ages, such as small stand openings. OAF 2 can account for factors whose impacts tend to increase over time, and whose influence on a stand may be reduced through management practices, such as pests, disease, decay, waste and breakage.

In the analysis, the licensee applied an area-weighted average OAF 1 of 11 percent and the standard provincial reduction of 5 percent for OAF 2. BCFS Research Branch reviewed the methodology used by the licensee to develop the OAF values and accepted them for this analysis.

I have reviewed and discussed the information regarding OAFs with BCFS staff. I conclude that the OAFs used in the base case are based upon the best available information and are therefore appropriate for use in this determination.

- minimum merchantability standards

In timber supply analysis, estimates are made of the earliest age at which a forest stand has reached a harvestable condition or has met minimum merchantability criteria. The assumptions largely affect when second-growth stands will be available for harvest in the model. In practice, many forest stands will be harvested at older ages than the age at which they reach minimum merchantability, due to economic considerations and constraints on harvesting which arise from managing for other forest values such as visual quality, wildlife and water quality.

In the TFL 52 timber supply analysis, minimum harvestable age for most existing natural and managed stands and all future regenerated stands was based on the age at which the stand achieves culmination of mean annual increment (MAI). For existing stands with marginal timber quality, minimum harvestable age was specified as the age at which the stand attains a volume of 120 cubic metres per hectare.

The licensee tested the effect of increasing and decreasing the minimum harvestable age by 10 years in a sensitivity analysis. Increasing the minimum harvestable age by 10 years resulted in a 14 percent reduction in the short- and mid-term, and a 1 percent increase in long-term timber supply compared to the base case. Decreasing the minimum harvestable age by 10 years resulted in a 9 percent increase in the short-term, and a 3 percent decrease in long-term timber supply relative to the base case.

Based upon my review and discussions with BCFS staff regarding minimum merchantability standards, I note that the average age of stands harvested in the base case decreases from 176 years in decade 1, to 80 years by decade five and 75 years by decade ten. During decades 5 through 10, I note that the actual age at harvest in the model is often as low as 50 to 60 years and the majority of the harvest activity involves small-diameter (approximately 20 centimetres at breast height) lodgepole-pine stands.

Having considered the information provided, I am particularly aware of the licensee's sensitivity analysis that indicates that a ten-year increase in minimum harvestable age results in up to a 14 percent reduction in short- and mid-term timber supply, a level that is seven percent lower than the current AAC. I am also aware that during decades five to ten a significant amount of the volume harvested will come from small-diameter lodgepole pine stands at or near minimum harvestable age. I note that for timber supply analysis, minimum harvestable ages are usually difficult to estimate and subject to considerable uncertainty. Given the significant short-term timber supply impact from increasing the assumed minimum harvestable ages by as little as ten years, I have considered the inherent uncertainty of minimum harvestable ages in my determination and I will discuss this under *'Reasons for Decision'*.

With respect to harvest profile and sequencing, I have considered the information and am satisfied that the analysis assumptions reasonably reflect current practice and are therefore appropriate for this determination.

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

Expected time for forest to be re-established following harvest

I have reviewed the information regarding impediments to regeneration and not-satisfactorily-restocked (NSR) areas, and am satisfied that the assumptions for these factors in the analysis were appropriate.

- regeneration and stocking standards

Regeneration delay is the period between harvesting and the time at which an area becomes occupied by a specified minimum number of acceptable, well-spaced seedlings. In timber supply analysis, regeneration delay is used to determine the starting point of tree growth for the yield curves that project volumes over time.

On the basis of its review of over 9000 hectares of harvesting conducted on TFL 52 since 1995, the licensee assumed a regeneration delay of 2 years in the base case. BCFS district staff have reviewed the information regarding regeneration delay and indicate that it is consistent with current practice on TFL 52.

In its MP No. 3, the licensee indicates that it currently plants 1800 stems per hectare on most of its harvested sites. BCFS district staff inform me that the planting densities for future managed stands assumed in the base case are consistent with current practice on the TFL. However, they note that according to their information, existing managed

stands established between 1980 and 1995 are stocked below the levels assumed in the base case.

I have discussed the information regarding regeneration delay and stocking densities with BCFS staff. I accept the assumptions regarding regeneration delay and stocking densities for future managed stands as suitable for use in this determination. However, with respect to existing managed stands established between 1980 and 1995, it is apparent that these stands will provide somewhat lower than projected yields because they are stocked below the levels assumed in the base case. Therefore, for this determination, I am accounting for an unquantified over-estimation in the mid-term timber supply. I will discuss this further under '*Reasons for Decision*'. For the next determination, I recommend that the licensee review and refine its stand density estimates for stands established between 1980 and 1995.

(iii) silviculture treatments to be applied to the area,

Silvicultural treatments to be applied

I have reviewed the information regarding the use of fertilization, juvenile spacing, commercial thinning and silvicultural systems for TFL 52 and I am satisfied that the base case assumptions for these factors were appropriate.

- select seed

The Forest Practices Code requires the use of the best genetic quality (seed and vegetative material) source available for regeneration. Select seed produced from seed orchards is the product of British Columbia's forest gene resource management program, which uses traditional tree breeding techniques to select naturally-occurring, well-adapted, healthy and vigorous trees.

Select seed from seed orchards produces trees that grow faster than trees resulting from natural stand seed for a specific time, which varies by species and site. As a result, a stand that originates from select seed has a greater volume at the same age than a natural stand with the same species composition. Current expectations are that the volume differences will begin to decrease beyond a certain stand age.

According to the licensee, since 1998 all spruce seedlings planted on TFL 52 have been grown from select seed. Furthermore, it indicates that by 2005 all lodgepole pine and Douglas-fir seedlings will also be grown from select seed. Use of improved seed is expected to provide volume gains at harvest of 8 percent for spruce and 5 percent for lodgepole pine and Douglas-fir. These anticipated volume gains were included in the derivation of the future managed stand yields included in the base case.

BCFS district staff have reviewed the information regarding the use of select seed and confirm that the information provided by the licensee reflects current practice on TFL 52.

The licensee provided a sensitivity analysis to test the impact on timber supply of not adjusting the managed stand yields for the genetic gains described above. In this analysis, the initial harvest level was reduced by less than one percent and the long-term harvest

level decreased by about 6 percent from 735 700 cubic metres in the base case to 693 400 cubic metres per year.

Based upon my review of the information regarding the use of select seed and my discussions with BCFS staff, I conclude that the assumptions regarding the use of select seed are representative of current practice on TFL 52 and are therefore appropriate for use in this determination.

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

Timber harvesting

I have reviewed the information regarding utilization standards and decay, waste and breakage factors assumed in the analysis for TFL 52, and I am satisfied that these factors were appropriately modelled.

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production,

Integrated resource management objectives

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

I have reviewed the information regarding watershed management, adjacency and green-up, recreation resources, mule deer winter range, cultural heritage resources and stand-level biodiversity (wildlife tree patches) on TFL 52, and I am satisfied that these factors were appropriately modelled in the analysis.

- riparian habitat

Riparian areas occur along streams, and around lakes and wetlands. The *Forest Practices Code Act of British Columbia - Operational Planning Regulation* requires the establishment of riparian reserve zones (RRZs), which exclude timber harvesting, and riparian management zones (RMZs), which restrict harvesting, to protect riparian and aquatic habitats.

In 2000, the licensee completed a stream classification for TFL 52. For the timber supply analysis, six stream classes (S1 – S6), consistent with the *Riparian Management Area Guidebook*, were assumed. In the analysis, RRZs measuring 50 metres, 30 metres, and 20 metres in width were assigned to S1, S2, and S3 streams, respectively. For lake

classes L1 and A – E, and for wetland classes W1 and W2, 10-metre wide RRZs were assigned. Forest cover requirements for RMZs were converted into equivalent land base deductions and—with the exception of the S6 stream buffers—combined with the reserves into riparian buffers. In total to account for riparian resources 12 072 hectares were excluded in deriving the timber harvesting land base.

According to the licensee, it did not exclude the RMZ area associated with S6 streams from the timber harvesting land base because of its small buffer width (one metre, representing 10 percent basal area retention along these streams) and the licensee's contention that it is not required to reserve area adjacent to S6 streams in its operations on TFL 52. The area amounts to 1117 hectares, or about 1 percent of the timber harvesting land base.

BCFS district staff have reviewed the licensee's riparian deductions and suggest that the total length of S6 streams estimated for the analysis is too high. However, district staff disagree with the licensee's assertion that it is not required to retain a one-metre wide reserve adjacent to S6 streams. District staff advise that the licensee has received instructions from the district managers and designated environment official (letter dated October 30, 2000) requiring it to follow the best management practices for S6 streams from the *Riparian Management Area Guidebook* unless it can provide a rationale for not doing so. Furthermore, district staff contend that the licensee is retaining trees adjacent to S6 streams.

I have reviewed the information regarding riparian areas and I note that there is some uncertainty regarding both the current practices adjacent to, and the actual length of, S6 streams on TFL 52. In combination these uncertainties may result in a reduction in timber supply of between 0 to 1 percent compared to the base case forecast. For the next determination, I request that BCFS staff and licensee staff clarify both the length and management practices associated with S6 streams on TFL 52. For this determination I accept the assumptions regarding riparian management as being adequate and I have made no adjustments on this account.

- visually sensitive areas

Careful management of scenic areas visible from communities, public use areas and travel corridors is an important forest management objective. The Forest Practices Code enables the management of visual resources by providing for scenic areas to be identified and made known, and by providing for the establishment of visual quality objectives (VQOs). A visual landscape inventory is undertaken to identify, classify and record visually sensitive areas. Based on this inventory, visual quality classes (VQCs) of preservation, retention, partial retention, modification, or maximum modification may be recommended to guide operational practices in an area. These recommended VQCs may become officially adopted and established by a district manager or through a higher level plan.

The licensee completed a visual landscape inventory of TFL 52 in 1995. Scenic areas with VQOs were established under the Cariboo-Chilcotin Land Use Plan in 1997. In 1999, the Quesnel forest district manager revised the management requirements in the

scenic areas along Highway 26 from Quesnel to the historic town of Barkerville by changing the VQO requirements of two viewsheds from partial retention to modification. The revised VQO requirements, which were applied to approximately 12 percent of the current timber harvesting land base, were incorporated into the base case for this determination.

To manage for visual quality, constraints are placed on timber harvesting, road building, and other forest practices. The constraints, which are based on experience, research findings, and public preferences, are expressed in terms of forest cover requirements that relate to the maximum percentage of a viewshed that may be harvested at any one time, and to 'visually effective green-up' (VEG)—the stage at which a stand of reforested timber is perceived by the public to be satisfactorily greened-up from a visual standpoint.

The management needs for stands in the retention, partial retention, and modification visual quality classes (VQCs) were represented by maximum disturbance constraints of 5 percent, 15 percent, and 25 percent respectively. A VEG height of 3 metres—the same VEG height assumed in the most recent timber supply analysis for the Quesnel TSA—was assumed for each of the VQCs and the IRM zone in this analysis.

Public input received by BCFS district staff expressed concern that the 3-metre green-up height might be inadequate to protect visual quality along the Quesnel-Barkerville Corridor if stand stocking densities are lower than 1800 stems per hectare. District staff advise me that the district manager has not established a green-up height higher than 3 metres, as the licensee has committed to future stocking standards of 1800 stems per hectare in this area.

I have reviewed and discussed the information regarding visually sensitive areas with BCFS staff and I am satisfied that the assumptions used in the base case are appropriate for use in this determination. I note the concern regarding VEG height in the Quesnel-Barkerville Corridor and acknowledge the licensee's commitment to maintain a stocking standard of 1800 stems per hectare in this area. I encourage district staff and the licensee to monitor these stocking densities and if the VEG height requirement is adjusted in this area, to include this new information in the analysis for the next determination.

- wildlife habitat

1) identified wildlife

For wildlife species considered to be at risk, the Conservation Data Centre of British Columbia maintains forest district tracking lists. These lists identify those species and plant associations considered to be at risk (e.g., endangered, threatened, vulnerable or sensitive) and which are known to occur, strongly expected to occur, or which have occurred in the past within a given forest district. The Identified Wildlife Management Strategy (IWMS) addresses habitat management for specific species considered to be at risk.

Identified wildlife refers to species at risk (red- and blue-listed) as well as regionally significant species that are potentially affected by forest management activities and that have not been adequately accounted for through existing management strategies. While

the biodiversity and riparian provisions of the Forest Practices Code are intended to provide for the needs of most wildlife species, some species that are considered to be "at risk" require special management practices. The Province's *Identified Wildlife Management Strategy* (IWMS)—released in February 1999—provides mechanisms for managing critical habitat for identified wildlife species including Wildlife Habitat Areas (WHAs), General Wildlife Measures (GWMs) and higher level plan recommendations.

According to the licensee's MP No. 3, there are seven identified wildlife species expected to occur on or near the TFL. These include bull trout, American Bittern, Sandhill Crane, Northern Goshawk, fisher, grizzly bear, and mountain goat. In the MP the licensee indicates that habitat requirements for bull trout, American Bittern, and Sandhill Crane will be met through riparian management area practices. It further expects that fisher and grizzly bear habitat requirements will be met within the current management regime for the TFL and notes that to date neither Northern Goshawk nests nor mountain goats have been observed on the TFL. Although no WHAs have yet been delineated on the TFL, the licensee suggests that sufficient areas exist outside of the timber harvesting land base to locate any potential WHAs.

For this determination, no information is available to specify the exact location or precise amount of WHAs that may be required within the timber harvesting land base to implement the IWMS. However, I note that government has limited the impact of management for identified wildlife in the short term to a maximum of one percent of the harvest level for the province. Given the Province's commitment to implementing the IWMS, and given the policy decisions and projected one-percent impact—and noting the expected occurrence of identified wildlife within TFL 52—I find it appropriate to assume an expected but not fully quantified impact on the timber supply for TFL 52. I have therefore concluded that timber supply may be up to one percent lower than projected in the base case and will consider this under '*Reasons for Decision*'.

As the Province implements its strategy for the management of species at risk, I expect the specific implications to be reflected in future timber supply analyses for TFL 52 and these will be taken into account in future AAC determinations.

2) caribou habitat

In 2000, the Ministry of Forests, the Ministry of Environment, Lands, and Parks (now the Ministry of Water, Land and Air Protection) and the CCLUP Caribou Committee accepted a revised Mountain Caribou Strategy. This strategy, which is based on terrestrial ecosystem mapping, provides refined caribou habitat boundaries and identifies areas that have been classified as "no harvest" or "modified harvest" zones. A total of approximately 22 000 hectares (9 percent of the total TFL area) consists of areas identified as caribou "no harvest" zones. According to the licensee, minor revisions to these areas have taken place since the mapping used in this analysis was completed, however the updates have not been finalized and could not be addressed in the analysis.

The caribou "modified harvest" zones cover a total of 9433 hectares with 7242 hectares contributing to the timber harvesting land base. A further 2719 hectares are within the

caribou "conventional" area with 2507 hectares contributing to the timber harvesting land base.

The CCLUP Integration Report (see Cariboo-Chilcotin Land Use Plan) allows for the harvesting of up to 10 percent of stands within the caribou "no harvest" zones for salvage purposes. In the base case the licensee fully excluded the caribou "no harvest" areas from contributing to the timber harvesting land base. This assumption was based on the licensee's uncertainty regarding the amount and species composition of salvaged stands that might occur in the caribou "no harvest" zones. BCFS district staff expect that salvage operations are likely to occur within stands identified as caribou "no harvest" zones. They note that the issue of salvage in caribou "no harvest" zones was reviewed during the land use planning process and incorporated in the CCLUP Integration Report.

The CCLUP Integration Report strategy for managing caribou in the "modified harvest" zone allows for "a 33% removal on an 80 year interval for a strategy rotation of 240 years". In the base case, the licensee modelled this strategy by allowing 33 percent of the volume of stands to be harvested every 80 years. In addition, the licensee applied a forest cover requirement allowing no more than 33 percent of the productive area in the zone to be covered with stands less than 20 years old.

Within the caribou "conventional" zone, no special limitations on timber harvesting to account for caribou habitat apply. In the base case the licensee assumed standard adjacency constraints whereby no more than 35 percent of the area may be occupied with stands less than three metres in height.

I have reviewed and discussed the information regarding caribou habitat with BCFS staff. I accept the assumptions used in the base case for the caribou "modified harvest" zones as being appropriate for use in this determination. However, I am aware that the 10 percent disturbance assumption within the caribou "no harvest" zone, which represents up to one percent of the timber harvesting land base, was established by the CCLUP Caribou Committee after careful consideration of the habitat requirements for caribou, the need to remove timber from these areas for salvage purposes, and to achieve CCLUP long-term timber targets. Therefore, for this determination, I conclude that the timber supply projected in the base case may be under-estimated by up to 1 percent and I will discuss this further under *'Reasons for Decision'*.

I am also aware that regional and provincial caribou management and recovery strategies continue to be refined and where appropriate, I will incorporate new information and further studies into subsequent determinations.

- biodiversity

Biodiversity is defined as the full range of living organisms, in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems and the evolutionary and functional processes that link them. Under the Forest Practices Code, biodiversity in a given management unit is assessed and managed at both the landscape and stand levels.

- landscape-level biodiversity

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and reasonably located patches of old-growth forests for species that are dependent on, or are strongly associated with, old-growth forests. Although some general forest management practices can broadly accommodate the needs of most ecosystems, more often a variety of practices are needed to represent the different natural disturbance patterns under which ecosystems have evolved.

The delineation and formal designation of 'landscape units' is a key component of a subregional biodiversity management strategy. A landscape unit is an area established by the district manager, generally up to 100 000 hectares in size, based on topographic or geographic features such as a watershed, or series of watersheds, to manage biodiversity and other forest resource values.

The *Biodiversity Guidebook,* the *Landscape Unit Planning Guide* and *Higher Level Plans: Policy and Procedures* all provide policy and guidance on management for landscape-level biodiversity. The *Landscape Unit Planning Guide* provides guidance on which components of the full range of recommendations included in the *Biodiversity Guidebook* should be implemented to achieve a balance of forest management objectives. The *Landscape Unit Planning Guide* contains forest cover requirements for old seral forest that are to be applied at the biogeoclimatic variant level within each landscape unit. The requirements are stated as a minimum percentage of the productive forest to be retained in stands above a specified age that varies by ecosystem type. The guide also allows the old seral requirement to be phased in over time in landscape units with a lower biodiversity emphasis.

The 1996 Higher Level Plans: Policy and Procedures guide provides further policy guidance. It outlines three biodiversity emphasis options (BEOs)—lower, intermediate and higher—that may be employed when establishing biodiversity management objectives for a landscape unit. To achieve a balance between biodiversity and timber supply objectives, this guide recommends the application of a mix of BEOs in each subregional planning area. The proportions of a planning area subject to lower and intermediate biodiversity emphasis should range from 30 to 55 percent, with the average at approximately 45 percent of the area subject to lower, 45 percent to intermediate, and 10 percent to a higher BEO (45-45-10).

The CCLUP *Biodiversity Conservation Strategy* and *Integration Report* include draft landscape unit boundaries and draft biodiversity emphasis options for use in the subregional planning process and as information for landscape-unit and operational planning. The draft landscape units—with minor changes from the Cariboo Region Landscape Unit Plan Strategy (CRLUPS)—were referred to in the October 2000 statutory decision makers' letter which provided licensees with direction on landscape level biodiversity in the preparation of forest development plans. BCFS district staff indicate that this direction reflects current management in TFL 52.

In its base case the licensee used the landscape units and BEOs from the CCLUP *Biodiversity Conservation Strategy*. In accordance with the *Strategy*, the licensee applied mature-plus-old seral and old seral requirements for each biogeoclimatic variant in each landscape unit as detailed in the *Landscape Unit Planning Guide*. It assumed that the productive forest within landscape units covering both TFL 52 and the Bowron Lake provincial park contributes to landscape-level biodiversity requirements. Otherwise, seral stage requirements were to be met solely within the boundaries of TFL 52.

The licensee provided information related to the inventory adjustment factors developed by the Biodiversity Strategy Committee. These factors were intended to address apparent inaccuracies in the forest inventory regarding the total area of old forest on the landscape. According to the licensee's information, a deficit of old forest in many landscape unit/biogeoclimatic variant combinations currently exists on TFL 52. However, when these factors are applied, the proportion of old forest in every one of these combinations meets or exceeds the required targets. The licensee provided a sensitivity analysis that showed that if the old seral age in NDT 1 and 2 is reduced from 250 years to 200 years, timber supply increases over the forecast period by seven percent.

I note that according to Update Note #1 of the *Regional Biodiversity Conservation Strategy*, the inventory adjustments were intended as first estimates. The purpose of the note was to provide further information to avoid inappropriate use of the factors.

I have reviewed the information regarding landscape-level biodiversity in TFL 52 and conclude that the assumptions incorporated in the base case are consistent with the draft landscape units and draft BEOs identified under the CCLUP *Biodiversity Conservation Strategy* and *Integration Report* and the CRLUPS. The statutory decision makers have provided direction regarding the implementation of landscape-level biodiversity requirements in TFL 52. Therefore, I conclude that the assumptions made in the base case regarding landscape-level biodiversity represent current practice and are appropriate for use in this determination.

Regarding the inventory adjustment factors, given the potential effects on timber supply demonstrated in the sensitivity analysis, I encourage the licensee to conduct studies to confirm if any adjustments to the TFL 52 inventory ages are warranted. I also encourage BCFS district and MWLAP staff to complete the location of old-growth management areas prior to the next determination.

- stand-level biodiversity

Stand-level biodiversity is managed by retaining reserves of mature timber, or wildlife tree patches (WTPs), within cutblocks and in adjacent inoperable and other retained areas to provide structural diversity and wildlife habitat. The Quesnel Forest District has a general policy of reserving 9 percent of the gross area of a cutblock in wildlife tree patches.

According to the licensee, it reviewed its existing mapped WTPs and found that 62 percent of this area did not overlap with areas that were excluded from the timber harvesting land base for other reasons. Using its GIS, the licensee then mapped and measured the area that is further than 250 metres from an existing WTP or previously

excluded productive forest suitable for WTP placement. For the base case, the licensee assumed that 62 percent of the 9 percent requirement, or 5.6 percent, needed to be excluded from the area measured as discussed above to account for future WTPs.

BCFS district staff have reviewed the mapped WTPs on TFL 52 and the methodology used by the licensee and accept the 5.6 percent WTP reduction factor.

I have discussed the information regarding stand-level biodiversity with BCFS district staff and conclude that the information is appropriate for use in this determination.

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

Cariboo-Chilcotin Land Use Plan

The Cariboo-Chilcotin Land Use Plan (CCLUP) was approved by government in October 1994 and subsequently declared a Higher Level Plan on January 31, 1996, under the *Forest Practices Code of British Columbia Act*. With the advice of the Regional Resource Board, the Interagency Management Committee developed additional information regarding implementation of the land use plan. The Higher Level Plan was varied on June 22, 1999, and the *Cariboo-Chilcotin Land Use Plan — Integration Report* was given official government policy status. Landscape unit objectives for the CCLUP area will be established following completion of sub-regional planning, which is underway. Detailed seral stage analysis is ongoing, and policy direction is provided periodically as required by the statutory decision-makers.

TFL 52 is included in the area covered by the CCLUP, and forest management and practices are required to be consistent with those aspects of the plan with Higher-Level Plan direction. In December 2000, the Forest Practices Board expressed concern regarding consistency between some aspects of the policy guidance expressed by government, and the commitments in the Higher Level Plan. The Board also later expressed concern regarding the interpretation of timber targets. I understand that these differences are being addressed through meetings and correspondence, an agreement to accelerate sub-regional planning in order to provide more detailed objectives, and clarification on timber targets. I also understand that the Deputy Minister of Sustainable Resource Management has recently expressed to the Board his confidence that the implementation direction that has been provided to date is sufficient to ensure that the plan is properly implemented in the short term, but acknowledges that clarification will be needed in the medium and long terms.

The licensee's timber supply analysis attempted to reflect those decisions and practices that are currently being implemented toward achieving the objectives of the CCLUP. Draft biodiversity emphasis options, as well as mature, and mature-plus-old seral stage requirements were modelled for each landscape unit, and visually sensitive areas and caribou "no harvest" and "modified harvest" areas were accounted for.

I acknowledge and accept that some changes to current management are likely to occur as detailed planning and implementation of the CCLUP proceed. Having discussed the CCLUP, including its implications and associated uncertainty, with BCFS and MSRM staff, I am satisfied that the assumptions employed in the analysis appropriately reflect current management and direction under the CCLUP. Overall I have been mindful of the land use planning decisions affecting TFL 52 and acknowledge that future determinations will reflect ongoing confirmation and clarification of the CCLUP.

First Nations

Although there are no First Nations communities within TFL 52, four First Nations have asserted aboriginal interests in all or part of the TFL 52 area. These First Nations groups are the Soda Creek (Xats'ull) Band, the Williams Lake (T'exelc) Indian Band, the Red Bluff (Lhtako) Band and the Lheidli T'enneh (Lheit-Lit'en) Nation. The Xats'ull, T'exelc and Lheit-Lit'en have initiated treaty negotiations through the British Columbia Treaty Commission (BCTC) process.

The Cariboo Tribal Council (CTC), which comprises the Xats'ull, the T'exelc and two associated bands, is currently in stage four of the treaty process, negotiating an agreement in principle. The Lheidli T'enneh are in the latter stages of negotiations towards an agreement in principle.

With respect to the timber supply analysis, BCFS district staff sent the above four First Nations a letter on July 9, 2002 along with copies of the TFL 52 information package and timber supply analysis report. The First Nations were invited to review the documents and provide written comments related to how their aboriginal interests could be affected by my AAC determination. First Nations were also invited to contact forest district staff if they desired a presentation on the information. District staff indicated that there were no written or verbal responses or requests for meetings or presentations.

I note that the licensee has committed to meeting with First Nations periodically during operational and management planning processes. In previous contact with BCFS staff, First Nations in the area generally have identified protection of the ability to hunt, fish, trap, gather plants for food, medical and other uses, and to maintain and cultural and spiritual connection to the land. Such uses have been generally documented in several traditional use studies and a cultural heritage overview. In addition, First Nations have expressed employment of band members and economic benefit from forestry activities as specific priorities.

I am also aware that local First Nations have undertaken silviculture contract work for the BCFS and licensees. The T'exelc, Lhtako and Xats'ull First Nations have received harvesting tenures through the Small Business Forest Enterprise Program (SBFEP) and have also been awarded Non-Replaceable Forest Licences.

I believe that consultations related to operational planning, including discussions between the licensee and First Nation which the licensee has committed to, offer a good opportunity for sharing information so that operations can be located, designed and timed to protect habitat, riparian areas and food and plant sites. I also note that the licensee has committed to annually reviewing proposed herbicide plans with First Nations to minimize

impacts on traditional use activities. The licensee indicates that it visited each band office during the preparation of its Pest Management Plan.

Information available to me suggests that harvesting can be appropriately located, timed and designed to avoid negative impacts on traditional uses. In addition, protection of wildlife habitat, biodiversity and riparian areas that forms an integral part of current forest management in the TFL, and that has been represented in the base case, will assist in maintaining the basis for wildlife- and fish-related uses.

At this time, the information I have considered suggests that no additional adjustments or measures related to traditional uses are required beyond the land base exclusions and management objectives incorporated in the timber supply analysis. I encourage continued consultation with First Nations on operational activities, as is normal practice in the province, to enable design and timing of forest operations to minimize and hopefully eliminate negative impacts on First Nations' uses.

I am satisfied that district and licensee staff have provided adequate opportunities for consultation with local First Nations to enable aboriginal interests to be considered and addressed in my determination. After considering the information available to me, I am not aware of any information that indicates that First Nations interests will be negatively impacted by my AAC determination. While I am aware of general expression of aboriginal interests in the FL area, the nature scope and geographic location of these interests remain inconclusive. I am therefore uncertain about whether such interests may have impacts on timber supply.

If I become aware of significant new information on aboriginal interests, I will consider it in the next scheduled AAC determination, or will re-visit my determination sooner if warranted.

Twenty-year plan

Timberline Forest Inventory Consultants (Timberline), on behalf of the licensee, used the spatially-explicit mode of CASH 6 (see "Timber supply analysis") to develop its twenty-year plan. The harvest level used in the twenty-year plan was based upon the harvest level projected in the base case. The initial 5-year period of the twenty-year plan included the blocks identified in the current forest development plan.

BCFS district staff have reviewed the twenty-year plan submitted by the licensee and are satisfied that the harvest level proposed in the base case can be achieved for a period of 20 years. The district manager accepted the licensee's twenty-year plan on February 21, 2002. In his acceptance letter he noted the concentration in the plan's harvest in the Victoria landscape unit and West Fraser's commitment to move this harvest pressure to other landscape units in operations.

I have reviewed and discussed the information regarding the twenty-year plan with BCFS staff and I am satisfied that the first two decades of the base case harvest projection is operationally achievable. I have been mindful of this information in my consideration of an appropriate harvest level for TFL 52.

(b) the short and long-term implications to British Columbia of alternative rates of timber harvesting from the area,

Alternative rates of harvest

The nature of the transition from harvesting old-growth forests to harvesting second-growth forests is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large timber volumes in older forests often permits harvesting above long-term levels without jeopardizing future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and mid-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

The licensee used the spatially-implicit version of CASH 6 to prepare two alternative harvest flows. In the first alternative forecast, a 15-percent increase in the base case initial harvest was maintained for two decades followed by a staged reduction to 573 100 cubic metres per year in decades three to five, four percent below the harvest level projected in the base case for these periods. The harvest level then increased to 653 000 cubic metres per year in decades 5 to 7 before increasing to the same long-term harvest level of 735 700 cubic metres per year projected in the base case.

In the second alternative harvest flow, the base case initial harvest level of 596 900 cubic metres per year was maintained for 25 decades.

I have reviewed the alternative rates of harvest modelled by the licensee and I note that while the initial harvest level projected in the base case can be maintained for 25 decades, increasing the initial harvest level results in a decline in the mid-term timber supply below that projected in the base case. I have reviewed the information presented to me regarding alternative rates of harvest and have considered it in my determination.

Community dependence on the forest industry

According to the licensee, its harvesting, reforestation, and wood-processing operations in the Quesnel area provide 885 person-years of direct employment. Approximately 70 percent of the silviculture work and 85 percent of the forestry work is done by Quesnel-based contractors.

The licensee estimated that its operations in Quesnel provide approximately 2655 person-years of direct and indirect employment. Of this total, it estimates that approximately 1354 person-years of employment are attributable to TFL 52.

I have reviewed the information and am mindful that the volume harvested from TFL 52 provides a significant contribution to the employment in the local area. However, I am also aware of the very dramatic increase in the allowable annual cuts for the adjacent

timber supply areas, aimed at lessening losses to the mountain pine beetle (*Dendroctonus ponderosae* Hopkins (Coleoptera: Scolytidae)). I am aware that a significant portion of the incremental harvest in these timber supply areas is likely to be processed in Quesnel, supporting employment that would otherwise depend in part on the harvest from TFL 52.

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

Timber processing facilities

- existing mills

The licensee operates a sawmill/planer, the West Fraser Mills Ltd. - Quesnel Sawmill Division, in Quesnel. It is one of West Fraser's largest sawmills. Also located in Quesnel is West Fraser Timber Company Ltd.'s (the licensee's parent company) and Daishowa Canada Company Ltd.'s Quesnel River Pulp Company, a bleached chemi-thermo-mechanical pulp (BCTMP) mill. This mill produces in excess of 700 tonnes per day. West Fraser also operates West Fraser Mills (Specialty Products) and West Pine MDF, a plant designed to produce MDF (medium density fibreboard) from locally-sourced raw material. According to the licensee's SMOOP, TFL 52 provides about 51 percent of the fibre supply for the company's Quesnel sawmill/planer facility.

I have reviewed the information and am mindful that the volume harvested from TFL 52 provides a significant contribution to the company's fibre needs in the local area. As mentioned above, I am also aware of the significant increase in harvest levels in areas surrounding TFL 52. I anticipate that much of the incremental volume will be processed in facilities with which the licensee is affiliated.

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia;

Economic and social objectives

- Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4).

This letter and memorandum include objectives for forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability." He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomic areas. To encourage this the Minister suggested consideration of partitioned AACs.

The Minister's memorandum addressed the effects of visual resource management on timber supply. It asked that pre-Code constraints applied to timber supply in order to meet VQOs be re-examined when determining AACs in order to ensure they do not unreasonably restrict timber supply.

I have considered the contents of the letter and memorandum in my determination of an AAC for TFL 52. I note that commercial thinning is not occurring to any significant extent on TFL 52 and the licensee has not indicated any plans to undertake any commercial thinning in its proposed MP No. 3.

However, as discussed earlier under *deciduous stands*, I note that the licensee did not include the volume attributable to deciduous-leading stands in its base case. Based upon my review of the information, I note that approximately 1 percent of the gross area of TFL 52 is occupied by deciduous-leading stands. Given their extent and potential to contribute to the timber supply of TFL 52, I have instructed the licensee and district staff to provide further information regarding deciduous-leading stands for consideration at the time of the next determination.

For this determination, I am satisfied that there are no further significant opportunities at this time for harvesting in previously uneconomical areas, beyond what was incorporated into the base case assumptions.

- local objectives

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives.

The licensee indicated in its draft Management Plan No. 3 that it actively solicited input on the statement of management objectives, options, and procedures (SMOOP) and the draft management plan. According to the licensee, it received one written request for further information regarding the management of recreational resources and two verbal submissions from individuals with trap-lines on the TFL; however, no modification of either draft document was required.

BCFS district staff have reviewed the licensee's public consultation process and confirm that the licensee has satisfactorily met its public input obligations.

I am satisfied that the licensee has carried out its public involvement obligations satisfactorily, and that no specific issues were identified in public review which would significantly impact this determination.

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Abnormal infestations and salvage

- *unsalvaged losses*

Numerous parasites, fungi or plants can kill trees or degrade the quality and value of logs. Unsalvaged losses are timber volumes destroyed or damaged by causes such as fire and disease that are not recovered through salvage operations.

Estimates for unsalvaged losses account for epidemic infestations that are not incorporated into yield estimates used in the analysis. Timber volume losses due to insects and diseases that normally affect stands (endemic losses) are accounted for in inventory sampling for existing timber yield estimation or though other methods. Losses associated with second-growth stands are addressed by application of operational adjustment factors (OAFs) as noted previously in this rationale.

Based upon a review of historical values and recent salvage records, the licensee estimated non-recoverable losses of 5000 cubic metres per year, 550 cubic metres per year, and 1200 cubic metres per year attributable to insects and disease, fire, and wind damage, respectively. Therefore, all harvest forecasts prepared in the timber supply analysis were reduced by a total of 6750 cubic metres per year to account for of non-recoverable losses. BCFS district staff have reviewed these estimates and indicate that they reasonably reflect current experience on TFL 52.

BCFS staff indicate that since the analysis was conducted, the mountain pine beetle epidemic that has been severely damaging lodgepole pine stands west of the TFL has spread to western sections of the TFL. According to the licensee, about one-third of the TFL area is currently affected. Licensee staff further indicate that the stands on the TFL largely consist of mixed species and therefore salvage operations include a component of "green wood" from species other than pine. In addition, stands in the eastern areas of the TFL consist of mixtures of spruce and balsam and contain little pine.

According to the licensee, in recent years it has harvested less than the AAC for TFL 52. Now it is harvesting approximately 25 percent more than the AAC to make up for the recent undercut and to salvage beetle-attacked timber. Licensee staff indicate that approximately 85 percent of the volume harvested is targeted at infested stands. Although they are satisfied that they can address the beetle problem within current harvest levels, they note that if the mountain pine beetle problem intensifies, there may be a need to review the AAC sooner than the scheduled five year period.

Having reviewed the information concerning unsalvaged losses and the mountain pine beetle infestation, I am satisfied that the assumptions on which the timber supply analysis were based represent the best available information; therefore, I accept the estimates for unsalvaged losses as used in the base case forecast as appropriate for use in this determination. However, if the mountain pine beetle infestation intensifies and the licensee provides me with information that suggests an uplift in the AAC is warranted on

this account, I will consider this information and I may determine a new AAC before the legislated five year deadline.

Reasons for Decision

I have considered the information discussed throughout this document, and I have reasoned as follows:

For the reasons stated in 'Timber Supply Analysis' and from reviewing the considerations recorded above, I accept the licensee's base case as an adequate basis from which to assess timber supply for this AAC determination.

In determining this AAC, I have identified factors which, considered separately, indicate that the timber supply may be either greater or less than that projected in the base case. Generally some of these factors can be quantified and their impacts assessed with some reliability. Others may influence timber supply by adding an element of risk or uncertainty to the decision but cannot be reliably quantified at this time. These latter factors are accounted for in determinations in more general terms.

In this rationale, I have identified several factors for which I believe the base case assumptions differ from current operational practices or conditions. These factors are summarized below.

Several factors indicate that the timber supply projected in the base case may be over-estimated. The factor that can be quantified with some certainty is:

- *existing roads, trails, and landings* – up to 80 percent of the area of old landings on TFL 52 have not been restocked and will not likely contribute to timber production unless a special effort is made to restock the area. Therefore, the timber harvesting land base assumed in the base case may be over-estimated by approximately 500 hectares, resulting in a potential 0.3 percent over-estimation in mid- to long-term timber supply compared to the base case forecast.

Several other factors also indicate that timber supply may be over-estimated in the base case, but to a degree that cannot be well quantified. They are:

- *intermediate utilization balsam stands* – I concluded that there is still considerable uncertainty regarding the actual contribution to timber supply from intermediate utilization balsam stands that were included in the timber harvesting land base;
- *deciduous-leading stands* – I noted that deciduous-leading stands, which were excluded from the timber harvesting land base, represent approximately 1 percent of the gross area of TFL 52. There is currently no information available to indicate the extent to which these stands might contribute to timber supply; however, it is reasonable to expect that some portion of these stands will continue to be suitable for harvesting in the future;
- *regeneration and stocking standards* – I noted that existing managed stands established between 1980 and 1995 were stocked at levels below those assumed in the base case. As a result, I concluded that these stands will likely achieve somewhat

lower than projected yields and may result in a reduction in mid-term timber supply compared to the base case forecast;

- *identified wildlife* – I believe it likely that some required WHAs will be located in areas that were already excluded from the timber harvesting land base derived for this determination. However, given the occurrence of identified wildlife in TFL 52, I expect that other WHAs will be located in areas assumed in the base case to contribute to the timber harvesting land base. Therefore, I believe there is a risk that timber supply may be up to one percent lower than projected in the base case.
- *minimum merchantability standards* – I note that the average age of stands harvested in the model decreased to 80 years and 75 years by decades 5 and 10, respectively and I concluded that timber supply projected in the base case is very dependent upon the mid-term harvest of small-diameter stands at or near minimum harvest age. I also noted that an increase of only ten years in the minimum harvestable ages assumed in the base case had a significant impact on modelled timber supply. Given the inherent uncertainty in minimum harvestable age estimates, I believe this factor introduces considerable uncertainty in the base case short and mid-term harvest projections;

Factors indicating that the timber supply projected in the base case may be under-estimated to a degree that can be quantified with some certainty are:

- *sites with low timber growing potential* – I concluded that the exclusion of about 1600 hectares of old-growth stands with volumes greater than 120 cubic metres per hectare from the timber harvesting land base may result in an underestimation in the base case timber supply across the entire forecast period of up to 1 percent;
- *caribou "no harvest" zone* – I noted that modelling of the caribou "no harvest" zone as a full area exclusion was not consistent with the CCLUP Integration Report, which indicates that up to 10 percent of this area may be available for harvesting. I concluded that this may result in an underestimation in timber supply of up to 1 percent throughout the forecast period.

In reaching my determination I have considered the above factors and I note that two of them—*sites with low timber growing potential* and *caribou habitat*—indicate that the timber supply projected throughout the forecast period has been under-estimated in the range of 0 to 2 percent. I believe these two factors are partially offset by an over-estimation of 0.3 percent in the mid- to long-term timber supply due to under-stocking on up to 80 percent of the area of old landing sites on the TFL.

However, in making this determination I am also faced with the following factors that introduce significant, but unquantified uncertainty in timber supply:

- *intermediate utilization balsam stands*,
- *deciduous-leading stands*,
- *regeneration and stocking standards*,
- *identified wildlife*, and
- *minimum merchantability standards*.

In particular I note the reliance in the base case on harvesting young, small diameter stands in the mid-term. I further note the likelihood that stands regenerated from 1980 to 1995 will not be yielding the volumes projected in the base case, and the harvest in decade 5 when timber supply is most limited includes a component of these stands. Finally, I note that an increase of ten years in the assumed minimum harvestable age causes a significant decrease in the short-term harvest level compared to the base case.

Given these uncertainties I am not prepared to increase the AAC to the extent proposed by the licensee. Instead I believe it is appropriate to increase the AAC to 570 000 cubic metres per year (3.8 percent higher than the current AAC), in the expectation that it may be possible to further increase the AAC at the next determination once many of the uncertainties have been clarified

More so than in previous determinations, I am influenced by the capacity and needs of timber processing facilities in the region. I am particularly influenced by the knowledge that the allowable annual cut has been dramatically increased in adjacent timber supply areas in order to avoid massive losses to the mountain pine bark beetle. I anticipate that much of the incremental harvested volume will flow to processing facilities that would otherwise depend on timber from TFL 52.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that reflects current management practices as well as the socio-economic objectives of the Crown, can best be achieved by establishing an AAC of 570 000 cubic metres, which represents an increase of 3.8 percent from the previous AAC.

This determination is effective January 1, 2003 and will remain in effect until a new AAC is determined, which must take place within five years of the date of this determination unless the re-determination date is formally postponed according to the provisions of Section 8 of the Forest Act.

As stated in *Guiding Principles*, I re-iterate that my AAC determination does not prescribe where harvesting should or should not occur, nor does it prescribe who should harvest the timber. If additional significant new information is made available to me, such as information concerning an increase in the mountain pine beetle infestation on TFL 52, or the management assumptions upon which I have predicated this decision, or First Nations interests, then I am prepared to revisit this determination sooner than the five years required by legislation.

Implementation

In the period following this determination and leading to the subsequent determination, I encourage BCFS and licensee staff to undertake the following tasks and studies. I recognize that the ability to undertake these projects is dependent on the availability of staff time and funding. However, completion of this work will help reduce the

uncertainty associated with key factors that affect timber supply on TFL 52. I recommend that the licensee:

- investigate the potential of the 11 000 hectares of intermediate utilization balsam stands to contribute to timber supply, including an assessment of the age class distribution and productivity of these stands;
- review the suitability of deciduous-leading stands to contribute to timber supply;
- complete phase 2 of the Vegetation Resources Inventory in order to refine estimates of existing stand volumes;
- reassess the extent of, and management practices for S6 streams; and,
- monitor stocking densities within the Quesnel-Barkerville Corridor to ensure that visual quality standards are being met.

In conjunction with BCFS and MWLAP staff, I also recommend that the licensee finalize the placement of old growth management areas across the TFL land base.

Ken Baker

Ken Baker
Deputy Chief Forester
December 19, 2002

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, reads as follows:

Allowable annual cut

8. (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(3.1) If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was determined under subsection (1) is not likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester

(a) by written order may postpone the next determination under subsection (1) to a date that is up to 10 years after the date of the relevant last determination, and

(b) must give written reasons for the postponement.

(3.2) If the chief forester, having made an order under subsection (3.1), considers that because of changed circumstances the allowable annual cut that was determined under subsection (1) for a timber supply area or tree farm licence area is likely to be changed significantly with a new determination, he or she

(a) by written order may rescind the order made under subsection (3.1) and set an earlier date for the next determination under subsection (1), and

(b) must give written reasons for setting the earlier date.

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to

(a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and

(b) different types of timber and terrain in different parts of private land within a tree farm licence area,

(c) [Repealed 1999-10-1.]

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine a rate of timber harvesting for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

(iii) silviculture treatments to be applied to the area,

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

1998-29-2; 1999-10-1; 2000-6-2; 2002-25-21.

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Appendix 2: Section 4 of the *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to

(a) encourage maximum productivity of the forest and range resources in British Columbia;

(b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

(c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are co-ordinated and integrated, in consultation and co-operation with other ministries and agencies of the government and with the private sector;

(d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and

(e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994

Appendix 4: Minister of Forests' memo of February 26, 1996

File: 10100-01

JUL 2 8 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

.../2

Province of
British Columbia

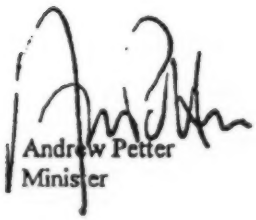
Minister of
Forests

Parliament Buildings
Victoria, British Columbia
V8V 1X4

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,



Andrew Petter
Minister

Province of British Columbia
OFFICE OF THE MINISTER

Ministry of Forests

MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: The Crown's Economic And Social Objectives Regarding Visual Resources

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.

As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

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In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis*.

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.

Andrew Petter
Minister of Forests